SNS COLLEGE OF TECHNOLOGY

An Autonomous Institution

Coimbatore-35

Accredited by NBA – AICTE and Accredited by NAAC – UGC with 'A++' Grade
Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai

DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

19ITT204 - MICROCONTROLLER AND EMBEDDED SYSTEMS

II YEAR/ IV SEMESTER

UNIT III EMBEDDED SYSTEM CONCEPTS AND PROCESSORS

TOPIC – 8051 INTERFACING WITH LCD

Interfacing 8051 to an LCD Display

OUTLINE

Liquid Crystal Display

- An LCD is electronically modulated optical device shaped into a thin, flat panel made up of any number of color or monochrome pixels filled with liquid crystals.
- It is often used in battery - powered electronic devices because it requires very small amounts of electric power

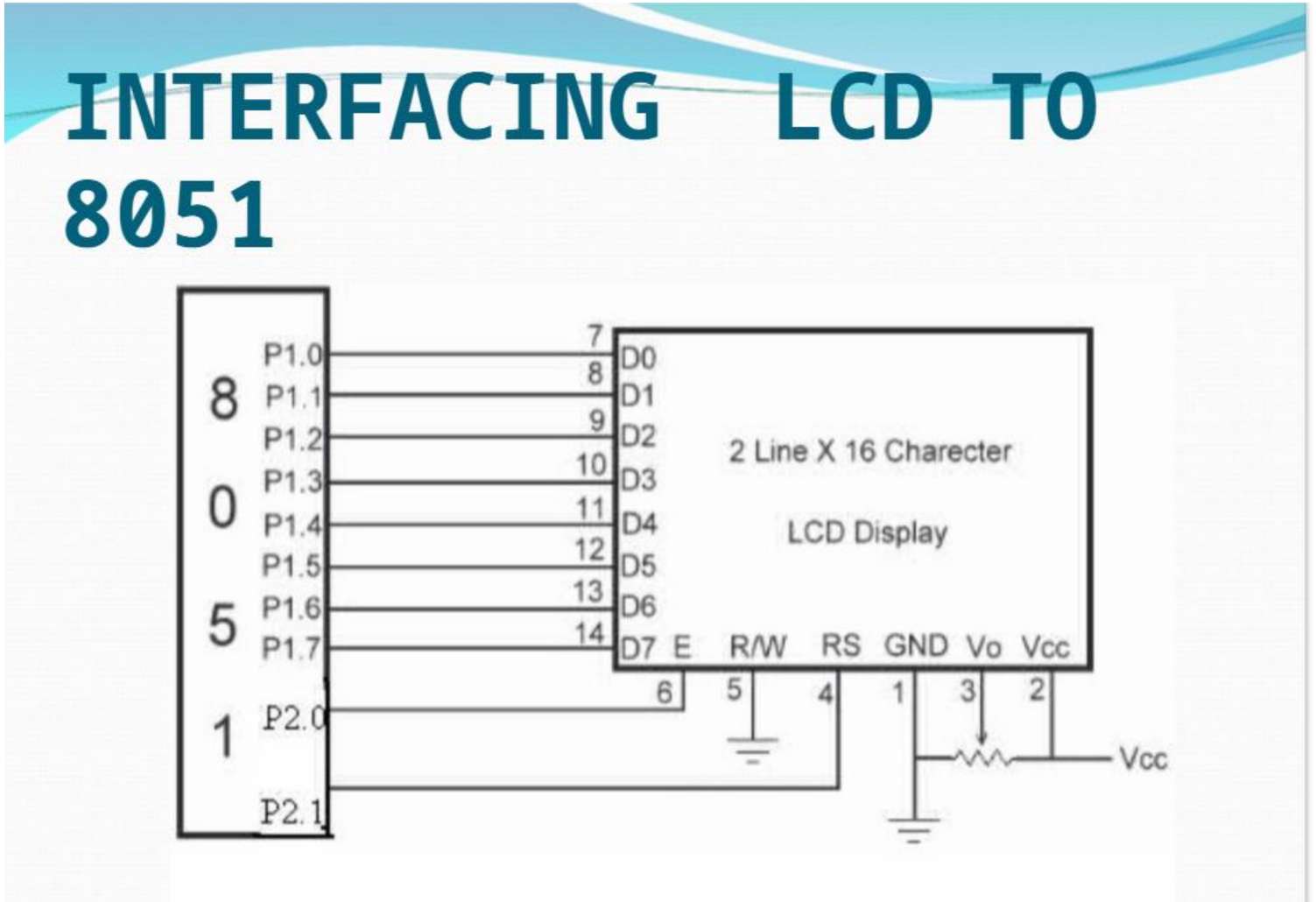
www.8051.in 2

Liquid Crystal Display

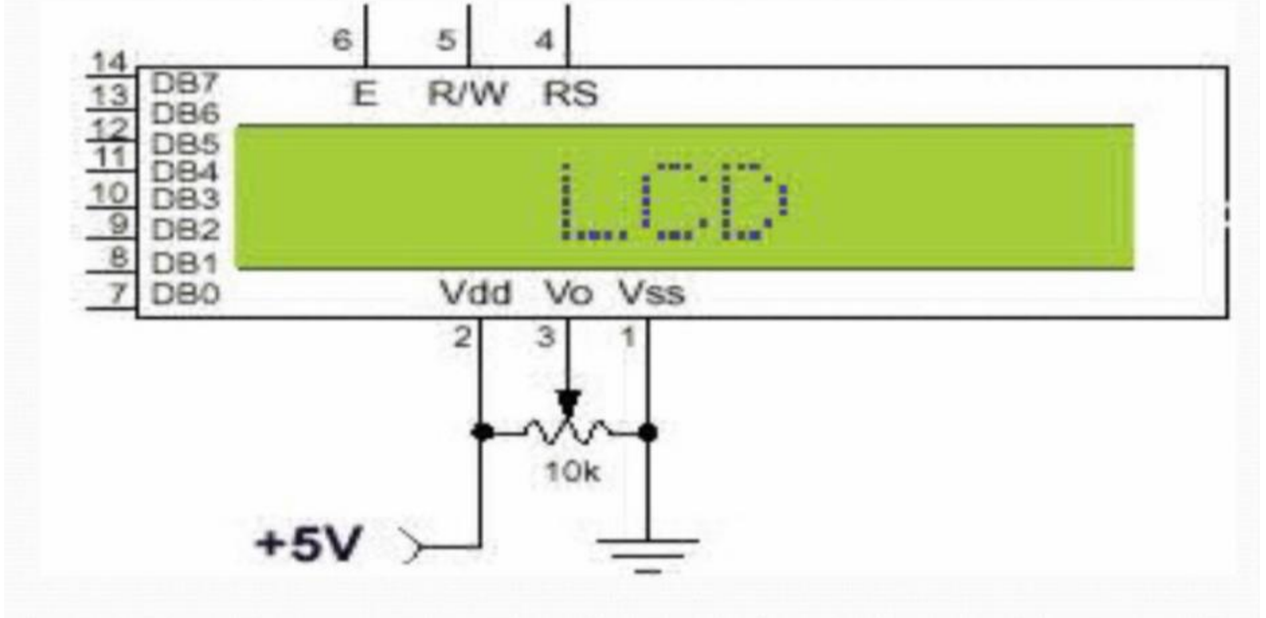
- LCDs have become a cheap and easy way to get text display for an embedded system.
- Common displays are set up as 16 to 20 characters by 1 to 4 lines.
- The most commonly used *ALPHANUMERIC* displays are *1x16* (Single Line & 16 characters), *2x16* (Double Line & 16 character per line) & *4x20* (four lines & Twenty characters per line).

An Example

INTERFACING LCD TO 8051



UNDERSTANDING LCD



Dot Matrix

- A 5X7 display consists of a matrix of lights or mechanical indicators arranged in a rectangular configuration.
- By switching on or off selected lights, text or graphics can be displayed.

Pin Out

Pin	Symbol	I/O	Description
1	GND	-	Ground
2	Vcc	-	+5V power supply
3	VEE	-	Contrast control
4	RS	I	command/data register selection
5	R/W	I	write/read selection
6	E	I/O	Enable
7	DB0	I/O	The 8-bit data bus
8	DB1	I/O	The 8-bit data bus
9	DB2	I/O	The 8-bit data bus
10	DB3	I/O	The 8-bit data bus
11	DB4	I/O	The 8-bit data bus
12	DB5	I/O	The 8-bit data bus
13	DB6	I/O	The 8-bit data bus
14	DB7	I/O	The 8-bit data bus

15 - VCC (Backlight) ,
16- GND

Pin-Description

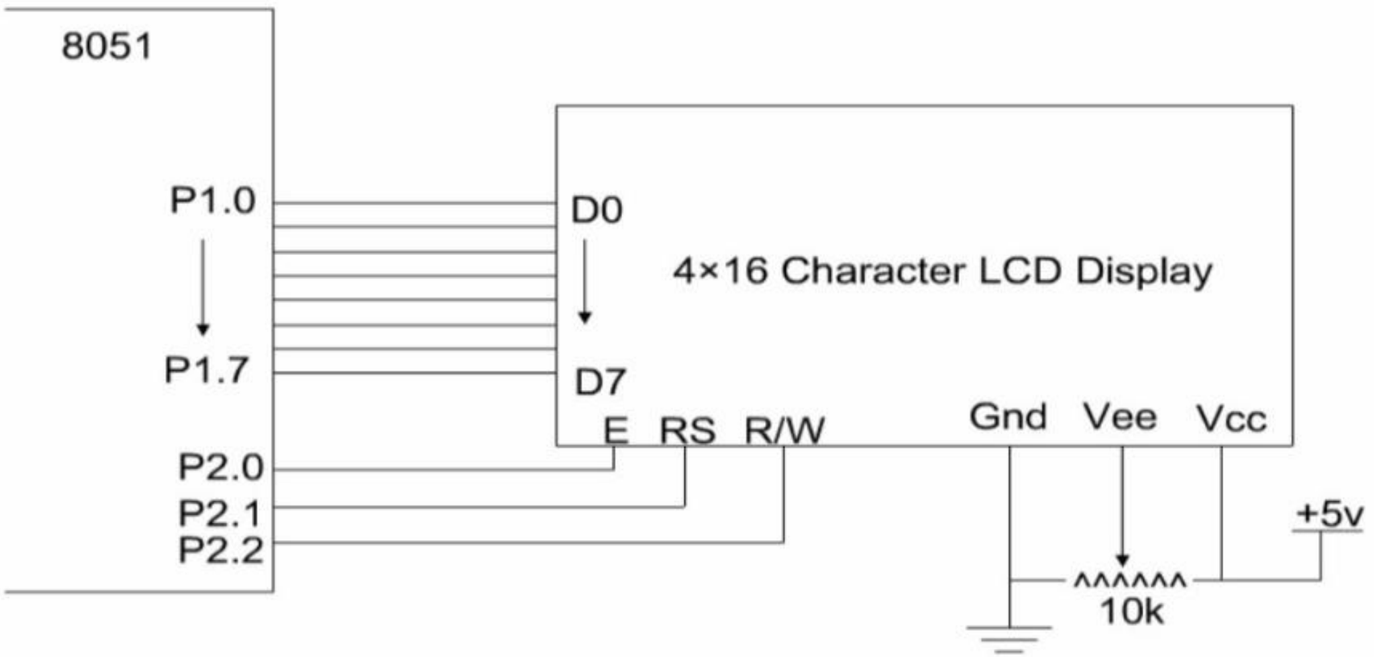
- **8 data pins D7:D0:**
  Bi-directional data/command pins.
  Alphanumeric characters are sent in ASCII format.
- **RS: Register Select**
  RS = 0 -> Command Register is selected
  RS = 1 -> Data Register is selected
- **R/W: Read or Write**
  0 -> Write
  1 -> Read
- **E: Enable (Latch data)**
  Used to latch the data present on the data pins.
  A high-to-low edge is needed to latch the data.
- **VEE : contrast control**

- For a 2x16 LCD the DDRAM address for first line is from 80h to 8FH & for second line is C0H to CFH.
- So if we want to display 'H' on the 7th position of the first line then we will write it at location 87h.

LCD Commands Table

Code (hex)	Command to LCD Instruction Register
1	Clear display screen
2	Return home
4	Shift cursor to left
5	Shift display right
6	Shift cursor to right
7	Shift display left
8	Display off, Cursor off
A	Display off, Cursor on
C	Display on, cursor off
E	Display on, cursor blinking
F	Display on, cursor blinking
10	Shift cursor position to left
14	Shift cursor position to right
18	Shift the entire display to the left
1C	Shift the entire display to the right
80	Force cursor to beginning of 1st line
C0	Force cursor to beginning of 2nd line
38	2 lines and 5x7 matrix

Project Assignment 4



THANK YOU